



*The Library of Surgeons
from the Author 6*
Lecture

ON

C H O L E R A,

AND OTHER

PESTILENTIAL DISEASES;

DELIVERED AT

The London Mechanics' Institution,

BY

SIR A. CARLISLE.

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LECTURE

ON

CHOLERA.

PREFACE.

THE following Discourse was hastily composed in familiar language for the purpose of delivery at the London Mechanics' Institution. I was urged to the task by the terrific and extraordinary expositions made by the Board of Health under the exclusive authority of Government, and sanctioned by high professional names. Since the public reading of my discourse, it appears that the first constituted Board of Health has either ceased to act, or it has been superseded by a more promising Board, called the Central Board of Health.

This approved change, together with the institution of a City of London Board of Health, equally deserving the public confidence, might seem to render my present observations unnecessary; but the various printed reports of my Lecture are so incorrect, and, in some instances, so unsatisfactory to myself, that I have felt obliged to give it to the press in its genuine form. Although many of the scientific and professional views herein announced may be known to my brethren, yet some of them are new, and perhaps of practical value. If, however, my present sacrifices tend to promote scientific inquiries, and afford hints to the few philosophers who practise the healing art, I shall be rewarded.*

6, *Langham Place*,
Nov. 29, 1831.

ANTHONY CARLISLE.

ALTHOUGH I have been accustomed to extempore speaking, matured years, have induced me to think that oratory is unsuited to appeals to the understanding, and upon this occasion eloquence would rather tend to excite the passions than to aid your reason.

It cannot be expected, that I shall attempt to give this intel-

* The liberal reader may be disposed to excuse the numerous errors of diction, and the irregular order of my arrangements, when he is told that during the delivery of the Discourse, every section of it was elucidated by extempore anecdotes, purposely intended to enliven the reading of several abstruse subjects.

ligent audience a popular exposition of the healing art ; indeed, I consider the pretences to make every man his own doctor, much the same as if a member of this institution should undertake to teach every man to be his own watch maker.

From the first institution of medicine as a profession, (and which is generally assigned to the ancient Greeks) the art of healing, has embraced several branches of knowledge, and these have been progressively improving to the present day. An acquaintance with the mechanism of the human body (termed anatomy), has ever been regarded as the principal and most essential foundation of medical science, because it displays the sources and the seats of diseases ; it exposes the changes of structure induced by several maladies ; and the damages occasioned by violence ; but until the natural uses of the different parts of the human body had been clearly proved, medical men could not determine the necessary connection between the mechanical textures of the human body and their respective offices ; and it would be still more absurd for a man to pretend to reason upon the disordered actions of the living frame unless he had first become intimately and minutely acquainted with the natural structure and chemical properties of every part and parcel of the human solids and fluids. These particulars are not however to be found in Greek or Roman authors ; for until the free co-operation of unfettered minds after the reform of religious thralldom, and the general spread of translations, and of critical discussion through the press after the introduction of printing, the healing art was restricted for many centuries to a few classic scholars, without any remarkable improvements or scientific discoveries.— A single illustration may serve to show the insufficiency of ancient learning as to anatomy, the main source of medical knowledge. Neither the Greeks, the Romans, nor the Medico-Theologians of the dark ages, had any idea of the circulation of the blood ; on the contrary, they entertained practically erroneous and absurd notions concerning the offices of the heart, and the different kinds of blood vessels, these subjects being unknown, until Dr. Harvey, one of the physicians to Charles the First, demonstrated them. Before that period the healing art was little better than the domestic medicine of our modern old ladies, who piously give reputed drugs at random for diseases which they are not qualified to understand, or even to distinguish from those of opposite character. I am induced to urge these points, because a mystical domination still continues among doctors of mere learning in favour of classic authorities, to the manifest injury of medical science. I do not desire to disparage the value of classic learning as a mine of derivations of words ; and as containing the earliest examples of human intelligence ; but I should act falsely to the convictions of forty years of practical experience, if out of courtesy I should pretend to admit either the theories or the practice of Greek physicians or surgeons, on a parallel with the advancing

philosophical reasonings which now guide the scientific members of our art. One palpable instance may be enough to prove this assertion—the healing of a cut wound is at this day as well understood as the gluing of two pieces of board; all the natural efforts of the damaged parts are clearly known, the vessels and materials employed have been demonstrated, and all the causes, whether constitutional or local, which tend to favour or to spoil the union of the divided parts, have been scientifically explained; but this knowledge, now apparently so simple and true, is of modern date, not half a century old, and not yet spread over Europe. Our predecessors imagined that every kind of healing was effected by special drugs, and they employed mundifiers, incarnators, digestors, and cicatrizers, as they termed certain medicines, to effect the processes which nature alone performs.

If surgeons generally have got rid of those superstitions, I fear that other branches of the art are not in all respects equally advanced. It is still to be lamented that the modern doctrines, which assume to explain the nature and causes of diseases, are a jumble of disgraceful contradictions, so much so that they are incomparably less logical than the theories of chemistry, and less exactly defined than many inferior branches of natural knowledge. Hence it arises that regularly educated practitioners are in many cases superseded by ignorant quacks. This want of general confidence is partly imputable to the state of the profession itself; and partly to the public deficiency of information. The blameable conduct of the members of the profession, is their continued adherence to mystery and to concealment of their remedies, a practice which places the desperate pretender on a level with the doctor who virtually prescribes secret means. This crying sin against common sense and candour, was removed in France by one of the laws of Napoleon, which forbids the writing of medical prescriptions in Latin, or under the disguise of mystical signs or abbreviations.

Another impediment to the public confidence in regularly educated medical men, arises out of the frequent vagaries of fashion, and of undue fame assigned to persons of slender natural talents, and with no pretensions to scientific attainments; to men of little experience and of small reputé among their brethren. Such instances of worldly favour create a foolish belief that medical or surgical skill may be a supernatural gift, and accordingly the same reliance is placed upon daring adventurers in cases of life and death, as should be exclusively given to the adopted sages and judges of the profession.

The want of a presiding philosophy at the head of the healing art has been wofully evinced during the short history of vaccination. A discovery which might have been a comfortable assurance against the terrors of the small-pox, if it had been directed by science, and by temperate reasoning; but under violent unfounded assertions, and the legalized edicts of medical fanatics, the subject has fallen into popular uncertainty, and the public

faith in medical judgment has become unsteady. Unfortunately, the two extreme ends of our community greatly resemble each other, since their follies and their vices are alike; the highest class thinking themselves above responsibility, and the lowest despair of meeting with moral consideration.

If medicine could have been established upon exact recorded precedents, and all succeeding cases had been fixed by the laws of nature precisely similar, then, indeed, might a laborious student, aided by practical observations, become in early life a master; but it is far different: for the evidences of diseases, and even of mechanical damages in the human frame are often obscurely marked, and mistakes in either are liable to be fatal. The organic capacities of the senses of every distinct man differ as much as the capacity to assemble and assort observations, and to draw sound judgments from them. For human reason is not reducible to certainty like the arithmetic computations of a sliding rule—under such uncertainties, and with no other selection than the choice of parents, it is not surprising that the officers of health differ so much in opinion and in practice; science alone ought therefore to rule their conduct, and afford general principles, while an enlightened public discriminates their several degrees of merit, and confers the proper station upon each practitioner. Assuming then that the healing art may be in many instances reduced to ordinary reasoning, I shall now proceed with my proposed subject.

Diseases are deviations from the healthful or natural operations of the living body, and the most destructive kinds which spread through large communities are called pestilential. I should trespass on your attention unworthily, if I should exhibit the conflicting and rancorous differences which now prevail respecting infectious and non-infectious diseases. It is sufficient for those who wish to be guided by common sense, to be told, that the different species of pestilence appear under more or less of malignity according to circumstances, which human prudence may often control; and those facts belong to our present purpose. I speak with confidence, supported by long and varied experience, and under scientific authority, when I assert that every kind of infectious pestilence varies in its degree of malignity according to known rules, and that the worst of them continue but a short time; either from a progressing dilution of the infectious matter, or from the bodies of persons exposed to the infection being gradually inured to its action, until they cease to be capable of being impregnated, as it happens to medical attendants and to nurses. Many years ago, a good old nurse at the Westminster Hospital told me that she had during forty years of service, attended and laid out more than a thousand patients who had died of putrid fever, and although many of the visiting pupils had caught that disease, she herself had not been once infected. Had it not been for these providential ordinations, every malignant infectious disease would spread universally,

and prove universally fatal ; for it is right on our part to acknowledge, that we do not possess any curative drugs, or special antidotes for many of those diseases. For example, in the small-pox, the measles, and in putrid fevers, we have no antidotes : these diseases run their course, while we watch the special distresses of nature, and afford the aids which experience and science suggest.

It is highly worthy of notice, that persons constantly employed as nightmen or as labourers in the most filthy sewers, are seldom attacked with those diseases which occasional exposure to putrid substances frequently produce.*

The public are grossly misled by words which often impute properties to things not founded in truth ; thus the bleaching liquid called chloride of lime is falsely called disinfecting, whereas it only stops or destroys animal putrefactions.

There is a curious coincidence respecting two diseases which have no natural cure, and for these art has supplied curative antidotes, I mean agues, which are cured by Peruvian bark, and a nameless disease curable by mercury. I wish I could say the same in that most horrible and incurable disease, canine madness, which seems to have no natural termination but in death—even that frightful malady requires a given quantity of infectious matter, and a given time to work, in order to generate its terrible venom ; for if the bitten part be covered by any garment, the infection seldom takes effect.

There are several means quite within your power which assuredly arrest the spreading of pestilential diseases, abate their violence, and strengthen the bodies of men to better endure their effects ; and my present endeavour is designed to awaken your attention, and to convince you of the reasonableness of those various measures.

Modern chemistry has abundantly shown the grosser constituent elements of compound substances, and those of the mineral kingdom are found to be in many instances united in fixed proportions, but not so the temporary and frail compounds of living creatures. Their especial materials are provided to suit the continued changes of growth, restoration of decays, or damages ; and to supply the waste accompanying those complex organic offices. Such unstable assortments of transitory materials as those which form the wonderful living and thinking automaton man, are placed in many respects above the reach of our philosophy ; but it does not follow that because our pride is balked of soaring to the knowledge of the Supreme, that we should slothfully or peevishly shut our understandings against the partial and practical attainments which the evidences of nature and improving human ingenuity afford. It is upon this plea that I desire the abolition of medical mystery, of medical classic superstition, and of metaphysical jargon ; and I know not where or how I can better begin

* I have lately obtained a valuable and authentic proof of this assertion, which it is not expedient at this moment to publish.

to work, than in assemblies of men possessing strong minds united to strong bodies ; men capable of comprehending the clear and solid truths of scientific demonstration and of scientific logic ; for I am convinced the hour is arrived to commence the overthrow of medical imposture of every kind, and for establishing the God-like vocation of healing on the safe and sure foundation of the exact sciences.

It is evident that every kind of infectious matter may exist in more or less degrees of intensity, or concentration ; and that by *excessive* dilution the most malignant of the pestilent poisons may be rendered harmless ; thus it happens that those infections which spread through the medium of the air of the atmosphere are gradually exhausted and lost, for if an infinitely small quantity of any such poisons had been capable of infecting human beings, we should have no security against their universal prevalence whenever a pestilent malady occurred.—But the proof of my assumption is determined by the degrees of violence in all infections, being in proportion to the intensity, the quantity, or the duration of the infecting cause, and upon this theory all the advantages of inoculation for the small pox stood, for in that process the minutest effective quantity of matter was employed, instead of taking the chance of an indefinite exposure to the infectious matter in what was called the natural way. It is worthy of notice, that every animal poison is propagated by producing its own kind under the effects of special inflammations ; thus, a tenth of a grain of small-pox matter introduced into the living frame by inoculation may create several thousand poek spots, each of them holding more than a grain of similar virus. An analogous fact is observable in the fermentation of malt liquors ; for a definite small quantity, say five grains, of yeast, will produce no effect upon a barrel of gyle, but five ounces will raise the fermentation, and create tenfold of its own kind into yeast. Thus also in the ague fever of Walcheron, those persons who were placed nearest the infecting ditches, or who remained for the longest time so exposed, were the marked victims of that malady, although the men placed only a few hundred yards more distant from the infecting vapours of those waters were exempt. In the last notorious gaol fever of Newgate, the uninfected prisoners brought the fever into the court and communicated the disease during their trials fatally to many of the officers ; such was its intense malignity upon strangers, although inoffensive to the persons confined within its very source.

Some years ago, the infection of measles was carried from the family of a laundress living a few miles distant, to several families of my acquaintance, in the returned clean linen ; for the carrier never entered her doors. In like manner I have known many instances of small pox and scarlet fever conveyed from house to house by medical attendants, but seldom so transmitted unless the disease raged severely at the place from whence it was thus conveyed.

The authentic histories of agues, show their dependance on the vapours arising from decaying vegetables in still waters, for the mere rotting of vegetable substances in a kitchen garden or in a farm yard never produce agues, and at a moderate distance from the place of those rank dissolutions of water plants, the human frame is exempt. Another still more striking circumstance is the season of the year in this climate, and the changes of rainy and dry whether in hot climates, when those fevers occur, they being notoriously connected with the decay of water plants.

In putrid fevers the cause of their origin may be generally traced to animal putridity, to the want of personal cleanliness, or to the want of fresh air in close dwellings, as in jails. In fact it appears demonstrable to all men of unperverted sense, that agues originate from a peculiar vegetable vapour, and that they are not transferable from man to man, while putrid fevers arise from animal putridity, and the person so disordered may spread the infection personally without limits, provided the victim be sufficiently exposed to an intense degree of the cause, or be for a certain length of time under its influence.

The following statement may serve to show the irregularity with which malignant infections are propagated. My late worthy colleague Mr. Morel, had the charge of a small detached plague hospital during the stay of the English army at Alexandria and Rosetta. One day his assistant-surgeon, together with two commissioned officers dined together in the same tent; they all partook of a rabbit soup served at two o'clock, and were consoled by observing that the cooking resembled their national fare. While sitting at table the serjeant announced that his wife who had cooked the dinner was taken suddenly ill; the two surgeons directly visited her, and discovered that she was unquestionably attacked with the plague. She was forthwith carried away to the distance of a few hundred yards, and placed on a frame under an awning. Medicines and other suitable necessaries were placed by her side, and the dismayed officers awaited the event. While it was yet day-light, they beheld the appointed attendants digging the sand for her interment.—The whole party passed the night and the following day in dread of the pest, but not one person received the infection. Upon inquiry it was found that the huckster who brought the rabbits for sale had buried his wife two days before, she having died of the plague.

Although agues and putrid fevers originate from different sources, each class assumes different degrees of severity according to the intensity of the infection, the state of health of those who are attacked, and to their previous habits; hence agues are more violent and more difficult of cure in persons who are poorly fed, or who live chiefly upon vegetables; while putrid fevers, including the plague and yellow fever, are most destructive to those who live grossly upon unwholesome animal food. These are not the fleeting vagaries of medical imaginations, but the

results of notorious experience and of public conviction, and the evidences have been adopted both as preventives, moderators, and remedies.

In some of the campaigns of the French armies during the last war, the soldiers most exposed to agues were provided with strong portable animal jellies for soups, which proved, in many cases, even curative. Up the Mediterranean when the plague is most liable to occur, the people abstain from fish, eggs, milk, and butter, and live chiefly upon corn and fruit diets; this regimen being found to abate the tendency to receive the plague, and even to diminish the averages of its mortality. It may be here remarked, that we do possess medicinal remedies for agues, but none for putrid fevers.—Those curious infectious diseases called small-pox, measles, and scarlet fever, appear to have originated in some chance medley of diseased humours, which is now utterly inexplicable; they seem to be of no great antiquity, and were unknown to the inhabitants of America when that quarter of the world had its first intercourse with Europe. I have already said that the medical art does not supply any curative drug for the small-pox, since that disease will have its course; but the fever which accompanies the small-pox may be often controlled by medical skill. In Spain it is customary to open all the pock spots with a needle as soon as they begin to show a contained fluid, and this is constantly repeated, so as to let out the offending matter during the whole progress of the disease. The universal conviction among Spaniards is, that such repeated discharges from the pock spots essentially assuages the fever, and prevents the disfiguring pits on the skin. There are striking differences between small-pox and measles, although each produces constitutional fever. The small-pox when taken accidentally is commonly the more dangerous as life advances, while the reverse attaches to measles. During the fever of small-pox, fresh air, and even cool air, is beneficial; whereas in the measles the fever frequently attacks the lungs, and on that account in cold weather it is proper to keep those affected by that malady in warm rooms. Now, although the infectious matters of small-pox or measles do not seem to be aggravated or augmented by outward circumstances, both diseases are most dangerous to those who are ill fed, who live in unhealthy places, or whose constitutions are disordered.

In putrid fevers the malady is distinctly aggravated by putrid air, and agues are more difficult of cure in the swampy regions where they originate: these known facts lead to practical applications on the serious measures to be hereafter submitted for the prevention or the abatement of pestilential cholera. Without entering into the prevalent disputes about contagion, or assuming that my views are better than those of other men, I wish to draw your attention to a few leading points. The air which we breathe, and by which we every moment exist, is capable of many admixtures, its variations in temperature, and in degrees of moisture,

manifestly influence human health ; but the contaminating additions of noxious vapours are even still more injurious. The sense of smell is directly appointed to warn us against the most common stench—I mean putrefactions, which we instinctively abhor ; but some vapours more immediately destructive, do not equally affront the senses, as the carbonic acid gas. Putrid vapours are, however, spontaneous and natural products, whereas the generation of carbonic acid gas is artificial, and nature has not provided us with safeguards against the ills of artificial creation : here we are compelled to seek remedies from science, and happily thus far the useful discoveries of science have kept pace with the evils produced by art in the highest states of civilization. Of the lingering adhesion of putrid vapours we have abundant proofs in the long continued offensiveness of garments, only exposed for a few minutes in a filthy place, in the smell of a stable, of hay, or tobacco, remaining in our clothes, and all the quarantine fumigations and airings of supposed infected substances are established upon these notorious evidences. That there are differences in the progress of putrefactive decompositions is obvious, because every putrefaction does not create the same infection. For instance, a mortifying sore sometimes occurs in badly ventilated hospitals ; but it does not arise from ordinary putrescence, it seems rather to depend on morbid chemistry.

A singular modified fever and sore throat lately happened in a family who were attended by a professional friend ; it raged severely throughout the inhabitants of that house, and destroyed two children ; but it spread no further. Upon carefully searching the under-ground offices, a large basket of decayed onions was found in an outer cellar, which yielded a most loathsome smell, and on their removal the pestilence ceased.

If I should seem to be proceeding in a tedious way, it is because I am anxious to make you acquainted with the reasons for adopting certain measures, and these must be implanted in your minds by various circumstantial illustrations. I therefore again desire to impress you with the leading points of this serious subject, viz. that all pestilential diseases vary in danger according to the states of health of their victims, and the intensity or condensation, or quantity, as it were of the contagious matter.

The sea scurvy, formerly a destructive pest to mariners in long voyages, has now become rationally understood. It arose from corrupted pickled beef and pork, foul water, and want of cleanliness. The disease seems to be a gradual putrescence of the living body, and its ravages have been notoriously fatal to those sailors who indulged in spirituous liquors ; it also occurs from similar causes in London. It is cured as if through a charm ; by taking the juice of a few oranges or lemons. Under the modern discipline of ventilation between decks, of personal cleanliness, and of occasional supplies of fresh vegetables or vegetable acids, that malady, so destructive in Lord Anson's time, is now

hardly known in the longest voyages. One of my most intelligent pupils settled in Warwickshire, some years ago came to London in great distress about a frightful series of deaths in a farm house. The farmer, his wife, and two inmates all died within a fortnight of a most malignant putrid fever. His son with a wife and three children took the farm, they immediately had the disease and all but one perished. A stranger and two servants then occupied the house, they also died within a few weeks. The horrid dwelling was closed, and at my request a strict search was instituted to discover the cause. All the likely sources of offensiveness were examined, but nothing remarkable found, until my scholar's attention was drawn to an old wooden vat containing stale pickled pork, which was known to have been resupplied without cleansing for many succeeding years. The vat still contained some of the old pickle; it had a very peculiar stench, not putrid, but sickening; the vessel was removed and buried, the house was lime washed, and a new tenant with his family then ventured to occupy the deserted farm, and lived there for many years in good health. Another anecdote may suffice to shew the noxious effects of corrupted food. The late Sir Humphery Davy while residing at the Royal Institution had a putrid fever, I attended him, and he was rapidly recovering, when some busy friend induced him to eat freely of stale grouse, his disease immediately returned under a threatening aspect, and he narrowly escaped.

It seems that both the vapours arising from animal putrefactions and inoculations with putrid substances are alike injurious; because a cut received during the dissection of diseased bodies mostly occasions dangerous effects, and generally produces putrid fever; in like manner the stench of those places often infects strangers with putrid fever, while the generality of fresh students have bowel disorders, until they become used to the offensive vapours; they at first betray uneasiness by frequent unconscious spitting, as if the liquids of the mouth so impoisoned were instinctively detected.

I shall now advance to the particular subject of our present anxieties, the pestilential cholera, which I do not regard with all the horrors so injudiciously heaped upon it by authority. Admitting myself to be in the same predicament with those who form the public boards, I do not on that account consider any of us incompetent to judge of the nature of this foreign malady, or unfit to direct its management; for Indian cholera resembles common and well known disorders of the same bodily organs; indeed, I have myself twice suffered the common cholera, attended in degree by all the effects belonging to the pestilential distemper, and not without danger. In one instance I examined and found the discharged fluid to be serum, with some addition of superfluous water, and containing flakes of fibrin. The whey-like discharges coagulated freely in a spoon held over a lamp, but I was too unwell to test the fluid for either free acid or alkali. The properties of the

peculiar venom which occasions Indian cholera is unknown, otherwise a chemical antidote might have been discovered, and I am sorry to say, that the pretended remedies, such as an almost poisonous dose of 20 grains of calomel, or a teaspoonful of oil of cloves, are desperate means, not advisable upon any rational principles, of no assured benefit, and therefore I agree with numerous others as to their ineligibility.

In order that my opinions and advice may be reduced to reason and common sense, I will endeavour to express them shortly, and without the perplexity of professional words.

Every species of cholera is denoted by vomiting and excessive discharges from the bowels; showing that the stomach and the intestines are the seats of the malady. Many drugs which specially irritate the stomach or bowels produce similar effects, such as the emetic root called ipecachuana, and the purgative elaterium, and their respective vomiting or cathartic effects, correspond with the doses given: it may be further noted that an excessive purgative medicine often kills weak persons. Improper diet, or food rendered indigestible, by drinking fermented liquors to excess upon a full stomach, may produce a temporary cholera; or the stoppage of sweating by sudden chills may drive the blood inward, and occasion an immediate flow of liquid into the bowels, for the inside of the bowels, of the lungs, and the kidneys resemble the outer skin of the body in several of their living offices, especially in being the common outlets for perspiration, evaporation by breathing, and filtration by urine, of the redundant water and spoiled materials of the blood.

The life of man depends from hour to hour, upon three principal sources—viz. the 1st, free breathing of the air around us, for if the breathing be stopped, or the chemical properties of the air be noxious, death soon follows. 2ndly. On the continuous circulation of the blood, and there are three essential causes of that motion; 1st, the muscular action of the heart, which is the mechanical engine appointed to force it along the vessels; but the heart will not act unless it be stimulated by blood chemically changed by breathing proper air; for if pure carbonic acid gas be breathed, the heart stops instantly. A second cause of the heart's action is the influence of the brain; since, if its communication with the heart is cut off by dividing the spinal marrow, called pithing, or if the brain itself be violently damaged, death speedily follows. 3rdly. The heart may stop from the want of a sufficient volume of blood to act upon, as it happens in the deadly bleeding of slaughtered animals. It may be further observed, that the living dominion of the brain and its governing powers depend on the supply of blood, for if the blood ceases to flow only for a few seconds, as in fainting, the mind becomes unconscious, the heart stops, and the breathing is hardly perceptible.

The application of all these facts will soon appear, if I should have succeeded in giving you clear ideas. For every respectable

medical authority now acknowledges that the first treatment of pestilential cholera is much within the grasp of unprofessional persons ; indeed, the sudden dangerous violence of its attack often prevents immediate medical aid :—let us then inquire into the rational causes of death in every species of cholera ; for I maintain that the causes are alike. The most malignant attacks of cholera, and those suddenly destructive, vent their rage upon the stomach, similarly to surfeits from unwholesome food, such as the stale shell fish called mussels ; and if in any of those cases the impoisonment of the stomach should quickly destroy its muscular ability to reject its noxious contents, vomits seldom operate, and the event is fatal. This form of attack, however, is not the most common ; it preferably seizes upon those who are in bad health from previous habits of intemperance, from destitution of wholesome diet, or uncleanliness. Medical men assume to distinguish three distinct kinds of flux from the bowels : an excessive laxity without fever, called diarrhea ; a malignant flux attended with fever, and often with discharges of blood, termed malignant or camp dysentery, a disease which has often destroyed more soldiers than the sword or bullet ; and the common cholera morbus, which varies in its fatality with climate, previous states of health, and local causes—all these maladies are so closely allied that they rather seem to vary in degree, and in their causes, than to be really different diseases. The most rational as well as the most successful treatment of them all is nearly the same. Every sort of flux depends on irritation of the stomach or bowels, or both ; and two kinds may be properly regarded as infectious ; but as I have already stated the spread of those infections is intimately connected with their local concentration, or intensity, with the condition of the person attacked ; and I wish to believe that the present violent disorders among my brethren as to infection and non-infection, arise from the desire of zealots to come at positive and perfect conclusions, which the vicissitudes and infirmities of our minds deny. A little charity for each other's weaknesses and different attainments, and a more strict observance of exact philosophic reasoning, from general evidence, without demanding universal concurrence, (which never happens), might do honour to our perilous and most responsible vocation. But to return to the immediate subject.—The pestilential cholera is unquestionably owing to an unknown special poison or irritant, and that cause produces more violent and more dangerous effects than the better known and grosser causes of the other fluxes termed diarrhea, common cholera, and dysentery. The manner in which the material cause of pestilential cholera gets into the human body is apparently unintelligible : the most obvious way is by the mouth in the first instance ; for the spittle is exposed to every vapour that is breathed, and we know that all watery liquids are capable of being impregnated with vapours. It is therefore no great stretch of probability to

say, that the common inroad of the infectious vapour of pestilential cholera is its descent along with the spittle into the stomach. I am aware that numberless physical and even metaphysical objections may be raised against this assumption, because it is too plain for medical mystics; but if it convinces your reason, and leads to common sense preventives, I shall have effected my purpose. Although many pestilent diseases may be reasonably considered to be transmitted in a state of vapour through the medium of the air which we breath, yet it may not invariably happen that the poisonous vapour always enters the human body through one and the same channel; for example, the plague and putrid fevers most probably enter by the lungs, and there infect the blood; while the vapour of pestilent cholera may pass directly into the stomach after impregnating the spittle. As I cannot foresee any harm from the adoption of this opinion, because it brings us more directly and more plainly to the knowledge of cholera, and leads to a natural explanation of a sufficient cause for all the effects of that malady, and for its frequent fatality, I will venture to add, that such a reasonable view may be safely confided in by the public.

That every kind of vomiting and bowel flux depends on irritation of the stomach and bowels is proved by the known effects of vomiting and purging drugs, which however act variously; some purgatives irritate the muscular coverings of the intestines, and thus cause them to force out their contents more rapidly than is natural. Some vex and irritate the exposed open ends of numberless small colourless blood vessels which belong to the linings of the intestines, and thus occasion an excessive flow of liquid into the bowels, in the same manner as the sweat flows out of the pores of the skin. In both cases the discharged liquids are derived from the circulating blood: but here it becomes needful to describe briefly the different gross elements which form the compound fluid called blood. When blood is drawn from the living frame it presently becomes a solid firm jelly, which is termed its coagulation; within a few hours the congealed mass gradually parts into two portions, a liquid called serum, like whey; and a red coagulum—this last however consists of two distinct substances, the colouring matter being merely entangled in the congealed mass, and consisting of minute red particles; the congealed part is called fibrin, because it assumes a thready texture. The entire blood contains the raw materials for the growth, the repairs, and the natural purification of the living body—and the proportions of its elements are continually varying under every meal of food and drink, and under the appointed purifying discharges, such as the urine.

The pestilential cholera, if it does not kill at the onset, becomes a drain from the volume of the circulating life stream; but the peculiar irritation of the bowels only strains off the serum or wheyey portion of the blood, together with the super-

fluos water; whereas in the malignant camp dysentery, which is connected with putrefaction, or accompanied by putrid fever, a larger class of blood vessels give way, and the whole compound of the coloured blood is poured out and copiously discharged from the bowels—hence it is termed bloody flux. Now although the offices of life admit of a greater diminution from the serum of the blood than of its gross bulk, because the animal machinery is habituated, as I have stated, to changes in the comparative proportion of the serum; yet an excessive and sudden drainage of the serum, without compensation by drinking, destroys life as effectually as bleeding from the common stock. Unfortunately in malignant cholera the stomach rejects the proffered supplies of drink, and if not, the intestines hurry their liquid contents through the body, so as to prevent any addition to the blood by the appointed vessels called the absorbents.

These complex evidences constitute our grand medical difficulties; for if the volume of liquid blood be suddenly and excessively reduced, without the power to replace it, the smaller and more remote blood vessels are emptied, the limbs become shrivelled, and the animal heat which mainly depends on a full and free circulation of the blood, is abated; the heart acts languid from the want of sufficient distention, and the offices of life dependant on the natural circulation of the blood, and on respiration, either cease or become defective.

This general view is remarkably exemplified in cholera; for the urine and perspiration nearly stop, and the liver falls short of its raw material the blood, because it is carried away by the wasting pipes of the intestines. In fact, that great laboratory for the bile, the liver, the natural stimulant of the bowels, strikes work.

This rapid sketch expresses my long deliberated notions upon the causes of coldness in the limbs, of the colourless discharges from the bowels, of the final sinking of all the living powers; and I believe that it is sufficient to account for the fatal results of this pestilent malady.

As to the reported terrific pains in cholera, I regard them as extravagant representations, and most injudiciously exhibited before the public. Providence has with infinite tenderness for our bodily miseries, ordained that the worst of human pains have limits; for either we speedily sink under them, or the capability to feel them abates as we approach to extinction. These facts are notorious in extensive scalds and burns, in the punishment of flogging, and in long continued desperate surgical operations, perhaps sometimes unjustifiable.

The anatomical examinations of the cholera sufferers after death affords no satisfaction; indeed the previous living evidences suffice to account for the event without adding offensive insults to prostrate misery. The only discovery arising from dissection might have been foreseen, viz. the reduced quantity of the blood, its assuming an uncommonly deep colour, and being imperfectly

congealed, all of them depending on the before known drainage of the serum and coagulating material from the mass of blood. But I will go further and say, that the modern flippancy and indecency with which those examinations are conducted, seldom advance medical science, for they generally display the incurable ravages of diseases already perfectly well known; and we have ample proofs that the frequency of the irreverent exposures of our mortal remains, render those operators callous, and subdue the best natural and religious safeguards of human life.

In each distinct kind of bowel flux the disorderly occurrences which we call symptoms vary in quantity and duration, and the danger to life vibrates according to the violence of these symptoms and the constitutional strength of the sufferer.

If, as I have already insisted, the manifest cause of slow death in cholera, be the sudden or continued loss of one essential portion of the blood called serum, and that the diseased flux depends on an im poisoned irritation of the stomach and bowels, then the rational common sense preventives, palliatives and remedies, are consequently apparent to every man's understanding.

The preventives are to be found in those abatements of communication which experience has shown to be adequate to stop or delay infectious vapours, until their inveteracy is lost, or so far diluted, as to be harmless; for it is certain that the infectious material of human diseases is of unstable character, and that every species of such matter loses energy by being stagnant, by dilution, or by extensive diffusion. These points have been abundantly proved in the history of vaccination, and Dr. Wm. Henry, of Manchester, has just published some truly philosophical experiments upon dried vaccine matter, by which he has shown that it utterly loses its power to infect after being exposed for two hours in air heated to 150° of Fahrenheit's thermometer, yet it retains its full energies after the same length of exposure to a temperature of only 120°. Probably, however, the analogy does not extend to vapours and to gaseous products. It should be remembered, that the putrefactive decomposition of animal substances is not superseded by exposure to the temperature of boiling water, as every cook well knows, and so likewise in roasting a haunch of over kept venison at a much higher temperature.

As to the effectiveness of local quarantine barriers in great cities, I not only despair of them as a preventive, but I dread their rigorous application; for if the attempt to imprison the cholera families in their own houses, or to commit them forcibly to lazarettos, or hospital prisons, so lately raised insurrections in the military governed cities of Russia, Prussia and Austria, I cannot see how that system can be practised in the free cities of England. Let us keep in mind, that hoards of men become mad and ungovernable, when pressed to desperation by fear; and I beseech you to be assured that your mutual safety and common welfare depend on steadily maintaining that rational calmness,

which alone gives courage, and presence of mind, in the hour of danger. If as it is asserted on strong and rational authority, the pestilent cholera can travel on the wings of the air, and that one preventive caution is to keep to windward; how can we expect to confine it by iron bars and sealed up doors? Alas! you will in vain flee from Wapping to Westminster in a westerly breeze, for within an hour the direction of the gale may be reversed. Still, however, strong preventive cautions should be strictly recommended, such as free ventilation of the infected houses, and the keeping idle visitors from the constant attendants on the infected; and here some practical good may be gained from the obdurate doctrines of non-infection; for unquestionably the pestilent cholera is far from being universally contagious, since those who are urged by their kind duties to be the most exposed, very generally go free.

The next important preventive safeguard is to be expected from temperance and wholesome appropriate diet; for drunkenness and gluttony have ever been considered ruinous during pestilences of all kinds, and they were known to be the provoking causes of cholera diseases long before the date of Greek writings on physic. The author of Ecclesiasticus says, "Sound sleep cometh of moderate eating, he riseth early, and his wits are with him; but the pain of watching and choler, and pangs of the belly, are with an insatiable man."—And again, "Be not unsatiable in any dainty thing, nor too greedy upon meats."—"For excess of meats bringeth sickness, and surfeiting will turn to choler."—"By surfeiting have many perished, but he that taketh heed prolongeth his life." Chap. xxxi. and xxxvii.—

The subject of dietetic regimen has engaged much of my professional attention, and I have for thirty years published, taught, and practically enforced the same rules of living as those recommended by the City of London Board of Health. I therefore refer you to those rules, with only the addition of a few objectionable articles, viz. shell fish, herrings, sprats, makarel, pork, veal, fruits of all kinds, raw onions, and other uncooked vegetables. Dietetics are however only applicable as preventives against the virulence of cholera, and as soothing moderators of disorderly states which render the attacks of cholera more dangerous; but it cannot be reasonably expected that any kind of diet will stop the infection of cholera, any more than it would the infections of small-pox or measles; this rule is, however, not applicable to diseases wholly occasioned by putridity, such as putrid fevers, for in them every putrid or putrescible accession becomes an addition in kind to the disordered body.

As to the dietetic treatment of persons actually invaded by cholera, it is to be rationally inferred from the preceding observations. I wish however to call your attention to the present very successful practice of the Parisian officers of health in their public hospitals. They gave no medicine in common cholera

excepting a few drops of laudanum whenever the sickness and griping demand that soothing drug : their common rule is to give abundantly of mucilaginous drinks, such as warm gunn water and mallow tea, and their nurses are directed to apportion the quantity and frequency of those drinks to the bowel discharges. In this way of proceeding the success of the French exceeds that of our more complex exhibition of drugs. There is a striking fact connected with drinking diluted saline waters, such as those of Cheltenham, for they merely rinse out the bowels without making any demand on the serum of the blood, hence many old and diseased persons drink those waters daily without becoming weaker.

To conclude. The pestilent cholera assumes two shades or degrees like common cholera—the one having a sudden and violent career, the other of slower progress and less malignant. The disease does not pass through regular stages like the small-pox, but it may cease at any period. In the rapid or acute form, the disease vents its rage principally on the stomach ; in the milder or slower progress it endangers existence by draining away the more liquid parts of the blood, and thus it exhausts the essential stream of life. All the other signs and symptoms so largely described appear to be necessary consequences of the reduced volume of the blood. The cause of this malady is unquestionably a peculiar poisonous matter, or ferment, the properties of which are unknown up to this hour ; since neither chance nor science have discovered any curative antidote. The cholera is not so destructive as many other pestilences, and it is unquestionably not so freely communicated. The preventive methods hitherto adopted have not effectually stopped the spreading of cholera, either by land or by water, and even the most rigorous and arbitrary means have failed to prevent its communication through large cities. Nevertheless, we are bound to employ every caution to stay the spreading of the disease ; because it is more than probable, that the intensity of the infectious poison is abated by every delay, and that it is diluted and rendered less virulent by being checked and controlled into a milder form as it spreads ; for thus it happens in jail fever and malignant small-pox. I again earnestly wish to impress this on your minds as a consolatory doctrine, founded on sufficient evidence, and practically applicable, under the direction of common sense.

In delivering my advice to you respecting the treatment of cholera, I only ask your concurrence as far as your reason is convinced. I will not offer any invidious remarks upon the first rules laid down under the authority of Government ; it is sufficient for my own justification to say, that I do not entertain the same opinions ; and that I am entitled thus to dissent on the score of my known labours to promote medical philosophy, and from my long continued public and private practical experience. To assuage that terror which I think is unnecessarily and unwisely propagated, I boldly assert that pestilent cholera is not

generally fatal in sound constitutions. or in persons who live temperately: let us therefore face the enemy, and cast aside those undue terrors which are too apt to sink men into fatal despair, and thence to augment their dangers.

On the first attack of pestilent vomiting and purging, let us regard those as natural and beneficial efforts to expel the poison; and let us watch the contest, until nature demands our artificial help. After the first few clearing discharges, aided by fifteen grains of magnesia in warm barley water to be given every hour for three successive times, we may safely interfere by giving from fifteen to twenty drops of tincture of opium, called also laudanum, in a glass of brandy, as the strength of the patient and the vehemence of the attack may warrant, and if immediately rejected by vomit, let the same dose be repeated every hour until it remains. This powerful remedy will often stop the disordered irritation of the stomach as if by a charm, the sufferer will fall into a perspiration if duly covered in heated blankets, and the pestilence vanish. This may be called the natural cure, as it arises from the discharge of the poisonous humour before it has had time to engender its kind in either the stomach or bowels.

For your better satisfaction, allow me to say, that I have been assured by several medical gentlemen from India, who have had the incipient attack of pestilent cholera, that this is a correct history, and that they have been restored to health within forty-eight hours. I think it also deeply deserving of notice, that as every similar poison is augmented under a lengthened continuance in the living body, the speedy stoppage of cholera is imperative; since it appears to gather in quantity or intensity with duration of the disease. When, however, the first stage has proceeded unchecked, and the exhausting discharges from the bowels continue, the best dependance is on an incessant supply of bland drink, such as rennet whey, or mustard whey with the white of an egg, given in small quantities, say a wine glass full, with the addition of eight or ten drops of laudanum, to allay the irritation of the stomach and bowels. If wine whey be given its free acid should be corrected by sal volatile or carbonate of soda, in doses of fifteen drops of the former, or fifteen grains of the latter, mixed with each cup of whey. Or thick barley water, arrow root, or gum arabic solution, may be given, with similar additions of laudanum, of sal volatile, or soda, or infusion of black pepper, cayenne, or ginger, in cases of sinking, where the preferable articles cannot be had. The body should be constantly heated by continued applications of hot blankets or flannels, and in public hospitals these cloths may be conveniently kept in readiness in a hot closet, such as is used by laundresses for drying linen; or on the hot water cylinders used for garden hot-houses, and for large rooms. All the best experienced authorities agree in stating, that the disease abates as soon as perspiration comes on. I request to be excused for not recommending the means proposed under the first Government authorities. External applications to the limbs, such as mustard blisters, spirits of wine and camphor,

would be utterly useless, since the stimulation of the skin depends wholly on the circulation of its blood, and where coldness and stagnation of blood befall the limbs, the only chance of restoring the circulation, is by invigorating the heart and filling its vessels through constant supplies of liquid stimulant nutriment—warm calves' foot jelly, beef tea, and rennet whey, require little digestion, and as they most resemble the serum of the blood, they may be advantageously taken as soon as the irritations of the stomach and bowels have been abated by laudanum, alkalies, aromatics, and soothing mucilaginous drinks,—quere, milk and water with albumen.

Finally, I regard every sort of cholera to resemble the others in effects, and dangerous consequences; and that the same views and the same treatment may be properly adopted, for them all. I am fully persuaded that chemical science will soon give us a curative antidote for the pestilent poison of Indian cholera; although the chance medley of empirical physic has hitherto failed; for it is to chemical science we must look, and not to the unavailing dissections of the dead, which in addition to the spread of natural horror, extend the infectious poison. Let us hope that the god-like art of healing will soon even overtake the beautiful science of astronomy, which has already, scaled the heavens and made us acquainted with the eternal and infinite structures of the universe, and that we shall as civilized society advances, become public officers to serve the whole community; instead of continuing a disgraceful worldly scramble in which every medical man becomes the enemy of his neighbour.

P. S.—My ingenious and scientific friend Mr. Goldsworthy Gurney, has just sent some important chemical suggestions, which deserve the attention of medical philosophers.

To Sir A. Carlisle.

My dear Sir,

THE uniform and uninterrupted progress of the disease, which by common consent, is called cholera, shews that hitherto all attempts to stop its ravages have failed; and, judging from public and other sources of information, I fear little has been done for it by medical treatment. It is observed by all classes of society, and with considerable concern, that medical men are divided in their opinions on some of the most important points connected with the disease—some are quarrelling about terms, which mean nothing, while others are discussing effects, without considering causes. All at present seems speculative and unsettled. In this state of things I send you the following observations, which I otherwise should not have done, considering it a public duty to society at this moment, that every person who supposes he can point out anything likely to be useful in this disease, should communicate his views to some one capable of judging of their value; and, if he confines himself to a private friend, and does not trouble the public, no matter how speculative they may appear, even to himself. Under this feeling, and knowing the peculiar direction of your scientific researches, I beg to submit the

following views respecting cholera, which have been floating in my mind ever since I left London. The particular object which I have pursued for the last few years, has been for the present, suspended by indirect acts of parliament, I have therefore had time to make a few experiments in connexion with the subject, which strengthen the opinions I am about to submit to you.

It appears, under all circumstances, that the best, and perhaps the only, line of study calculated to produce much solid or satisfactory information, will be by an inquiry chemically, so far as we are able, into the *elementary nature of the poison* which produces the disease. Considering the subject under this impression, we will take a general theoretical view of the physical nature of this poison. Our first conclusion will be, for it is self-evident, that every poison capable of producing disease, no matter how introduced into the system, whether through the lungs by the absorbents, through the skin, or by the stomach, is *material*; it has the ordinary physical properties of matter, and must obey its common laws. These laws render it capable of being communicated from person to person, or thing to thing, either through the atmosphere, or by any solid substances. In one state the poison may be so light as to float easily with the wind: in another state it may be so heavy as only to be moved by solid substances from place to place; in other states it may be so nearly on a balance with the atmosphere, so that, like very light dust, it may float with it, or settle on divers substances, and move with them, as by chance alone it never can be disturbed or otherwise influenced by mechanical causes; and thus a specific disease may, in the language of medicine, be epidemic, contagious, or infectious at the same time—these being terms which only express the manner in which a disease is communicated. These circumstances, do not, however, alter the nature of the poison.

Secondly. *Every specific poison must be a compound*: because no simple element (I am now speaking in chemical language) can be capable of producing a specific disease. This compound must be a chemical one, and definite; because the same kind of poison produces the same disease, and because all chemical bodies are definite. The poison of cholera produces a specific disease, it is therefore a definite chemical compound.

Our next inquiry will be into the nature of the *base or elementary constitution* of this poison, and a union of chemical and physiological research is necessary for this purpose. The last I fear will only indirectly assist us in our inquiry, since they are both but little understood as connected with vitality. You know the decompositions and combinations effected by vitality are not reconcileable with common chemical laws of matter: or is it not more easy for the chemist to explain how certain changes are produced by the living principle, than it is for an engineer to explain how or from what cause the origin of muscular power is to be attributed. We often find animal chemistry converting one simple element into another simple element, which in the language of the schools is a physical impossibility; yet it is so; it has been shown by you; and the accurate observers of nature see it every day. These imperfect sciences however are the only means likely to benefit us in our research, and

if we do not confine ourselves too long to negative terms and effects, and mistake them for positive facts and causes, we may by general analogy and reasoning possibly be led first towards a just suspicion, which may ultimately terminate in correct conclusions and practical truths. If by these means we can establish any valuable practical point, it matters not how much, or how long, its true theory may rest on circumstantial evidence. With this feeling let us take a general view of the character of the diseases said to be epidemic or infectious, which are occasioned by atmospheric or foreign agency. We shall find that some are inflammations and of an exciting nature, and that some are typhoid, and have a sedative tendency.

Amongst the first, may be classed all those said to be epidemic, such as agues, and influenza; amongst the second may be classed all those said to be infectious, or contagious, such as putrid typhus, plague, small-pox, and from all I can learn malignant cholera. These diseases are distinct in themselves, and are occasioned, I presume, by poisons of a different base; that of the first class I have every reason to believe is produced from vegetable decomposition, and is epidemic; the latter from animal decomposition, and is contagious. The peculiar element which gives the specific character to either will most probably be found in the kingdom from which they respectively originate, and therefore we must look to animal matter for the element which affords the base of these poisons, and which produce a putrid or decomposing tendency in the living body. In the analysis of vegetable matter, we find the elements hydrogen, carbon, and oxygen; in the analysis of animal matter we find these three, and also nitrogen, in abundance. It would appear therefore at first view of the subject, that we should look to nitrogen as the base of this characteristic animal poison, but when it is recollected that the atmosphere contains a large proportion of this substance loosely combined, if not mechanically mixed, we must see that it is present in all cases of vegetable changes, and so far, it is as likely to combine in any new formation in the one case as in the other; it is therefore not likely to be the principle which gives the characteristic property to this poison; we must therefore look further, for some other body in animal matter which is not present in cases of vegetable decomposition, for the base of putrid poison. On ultimate analysis, we shall find phosphorous forming a component part in all animal matter; in some state of combination, this element looks more suspicious than nitrogen, for although nitrogen is poisonous and offensive to the animal functions, when in some state of combinations, phosphorous in its simple state is highly so, and when taken into the stomach produces effects and symptoms very like choleric poison; this element is not met with in vegetable matter, and although the appearance of it, as sometimes seen in rotten wood, is produced by animalculi. In certain states of combination phosphorous is still more highly poisonous, and when partially given out, by the first process of decomposition, in fish, occasions their poisonous quality and symptoms, (not unlike cholera) also in other animal substances the same effects are observed. I have previously stated, that living animal chemistry changes one simple body into another; I would

here instance the fact, with which you are well acquainted, of the vital principle converting sulphur into phosphorous, during the incubation of bird's eggs; in short, so great is the tendency, either to its formation or liberation in all cases of animal putrefaction, that in the first processes it may generally be detected, and occasions the peculiar odour which invariably arises in that stage. It is one of the first products of putrefaction, and therefore likely to induce the same putrefactive tendency when brought in contact with certain animal matter even in the living state, like as yeast produces a fermentative disposition when brought in contact with the same kind of matter which has generated it. Thus in some cases of dead animal matter, poison of a simple putrefactive tendency would be produced, but in the living body, under process of specific disease, poison of a specific character and properties would be produced.

That the putrid-tending fever, produced by the inoculation of matter, "by animal yeast," from a subject in such state in the dissecting rooms, is not improbable, the analysis of some animal poisons, such as that of the viper and rattle-snake, are well worth recollecting in connexion with this view of the subject. It is not therefore improbable that this element in a peculiar state of combination is the base of the worst, and most mild crises of infectious disease, in some instances spreading the plague, in some typhus fever, some small-pox, and some the disease which we call spasmodic cholera.

If you think this view of the subject worth further notice, experiments may be made on the nascent combinations of phosphorous, which are at present but little known, with a view of judging more accurately of their effects on the animal economy, and also with a view of decomposing them by simple or complex affinities. Under the above hypothesis many substances would suggest themselves as likely to destroy or decompose contagious poison, such as hydrogen, sulphuretted hydrogen, increased temperature, which easily decomposes all loose phosphoric combinations. I would call your recollection here to the notorious fact of small-pox matter being rendered very soon inactive if carried in the waistcoat pocket, or in any warm situation. This fact seems to support the above hypothetical suggestions.

How far chlorine and its compounds affect specific typhoid or contagious matter is questionable; but there is no doubt that they suspend general animal putrefaction, and so far are of considerable value in destroying some of the predisposing causes which render the system liable to the more malignant specific poisons. It may possibly be useful to admit chlorine gas into any apartment which has been whitewashed against the disease, while the lime-wash is yet wet.

If the foregoing observations, or any part of them, in your estimation are worth further notice, perhaps you will turn them over in your mind. I am, dear Sir Anthony, faithfully yours,

Bude, Cornwall.

GOLDSWORTHY GURNEY.